

# UL/NEMA Non-combination and Combination motor starters Specifications

## Part 1 GENERAL

### 1.01 SECTION INCLUDES

UL/NEMA Non-Combination and Combination starters, with thermal or solid-state electronic overload relays. Starters may be of the full-voltage non reversing, full-voltage reversing, or multi- speed type.

### 1.02 REFERENCE

- A. NFPA 70 – National Electrical Code. ( NEC )
- B. NEMA ICS 2 – Industrial Control and Systems Controllers, Contactors and Overload Relays
- C. UL508 – Industrial Control Equipment
- D. UL508A – Industrial Control Panels

### 1.03 SUBMITTALS

Manufacturer shall provide (quantity) copies of following documents to owner for review and evaluation.

- A. Product data on the specified product
- B. Shop drawing on specified product

### 1.04 QUALIFICATIONS

Manufacturer shall be specialized in the manufacture and assembly of Non-Combination / Combination starters for 20 yrs.

### 1.05 REGULATORY REQUIREMENTS

Across-the-line, Multi speed , and Combination starters shall be Listed by UL

### 1.06 ENVIRONMENTAL CONDITIONS

- A. Follow (Standard) service conditions before, during and after motor starter installation.
- B. Starters equipped with solid state or thermal bi-metallic overloads are suitable for ambient outside of the enclosure from minus [thermal 25 to + 40 degrees Celsius / solid state 25 to +40 Celsius. When contactor is energized, temperatures will be above outside ambient within the enclosure. Temperature rises inside the enclosure shall not exceed 65 degrees Celsius.
- C. Mounting position: vertical

### 1.06 DELIVERY, STORAGE, AND HANDLING

- A. Store enclosed controller indoor in clean, dry space with uniform temperature to prevent condensation. Protect enclosed controller from exposure to dirt, fumes, water, corrosive substances, and physical damage.
- B. If stored in areas subject to weather, cover enclosed controllers to protect them from weather, dirt, dust, corrosive substances, and physical damage.

### 1.07 WARRANTY

- A. Manufacturer warrants equipment to be free from defects in materials and workmanship for 1 year from date of installation or 18 months from date of purchase, whichever occurs first.



## Part 2 Products

### 2.01 MANUFACTURER

Starter shall be manufactured by ABB or (approved equal).

### 2.02 BASIC STARTER DESCRIPTION

- A. Combination motor starter shall be rated in accordance with maximum UL horsepower ratings or NEMA size.
- B. Contactor contacts shall be silver alloy, and double break. Contacts on contactor size 9 amp thru 40 amps are not replaceable. Contacts on contactor size 50 amps thru 110 amps are replaceable, but require tools and line, load to be disconnected. Contacts on contactor size 145 amps thru 1650 amps are replaceable and require tools to change out. The line and load do not have to be disconnected on the 145 thru 1650 amp contactors.
- C. Contactor coils shall be the encapsulated type, and shall be replaceable on all the UL or NEMA rated contactors 9 amps thru 1650 amps with tools. Contactor size 9 amps thru 110 amps require line and load to be disconnected.
- D. Overload protection shall be provided by (thermal bi-metallic) (solid state electronic) overload relay. Single-phase starters shall provide one or two leg overload protection when wired per wiring schematic; three-phase starters shall provide three-leg overload protection.

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- E. Thermal overload shall be class 10 or 20 type bi-metallic. The overload shall be graduated in amps and in compliance with international / national standards. They shall have a visible trip indicator. They shall have reset mechanism that reset the overload. They shall provide (1 normally-closed and 1 normally-open isolated contacts).

Solid-state electronic overload relay shall provide user selectable settings, Class 10, 20 and 30. They shall have a visible trip indicator. They shall be ambient insensitive within an operating temperature range to minus -25 to +40 degrees Celsius. They shall have a visible trip indicator. They shall have reset mechanism that reset the overload. They shall provide ( 1 normally closed and 1 normally open isolated contacts).

Combination starter shall be suitable for straight through wiring.

## 2.03 FULL VOLTAGE NON-REVERSING

- A. UL Listed / NEMA size 00, 1, 2, 3, 4, 5, 6, 7 consisting of contactor with coil voltage of 24v, 120v, 208v, 240, 480, 575/600v at 50/60 Hz, overload relay, disconnecting means and short circuit protection shall be provided by (thermal magnetic circuit breaker) (magnetic only circuit breaker) ( non-fusible disconnect switch) (fusible disconnect switch class J fuse clip) factory assembled in Type 4, 4X, 7, 9, or 12 enclosure.
- B. Disconnecting means shall be provided with an external operating handle mounted in the enclosure door with the means to lock the handle in the off position. Mechanism on the handle shall prevent enclosure door from opening when handle is in the on position.
- C. Short circuit current rating of the combination starter shall be:
  - 1. Fusible type combination, 200 kA @ 600 V max.
  - 2. Breaker type combination rating of 35 kA, 65 kA, or 85 kA @ 480 V max.
- D. Starter shall include the following options:
  - 1. Control power transformer: Transformer shall include primary and secondary fusing.
  - 2. Auxiliary contacts: [1] or [2] normally open and [1] or [2] normally closed.
  - 3. [Phase failure relay [with under-voltage protection] and [elapsed time meter].
  - 4. [Start / Stop Pushbutton] [Hand/off/Auto Selector switch] [Off - On Selector switch] [ Fwd / Rev Pushbutton] [Start Pushbutton] [Fast/Slow/Stop Pushbutton] [Fast/Slow/Off/Auto Selector switch] [Emergency stop Pushbutton]
  - 5. [ Standard LED pilot light[s]. Color and functionality shall be provided as: [ red wired across coil and through normally open auxiliary contact].
  - 6. [Control relay with 2 normally open and 2 normally closed 10A rated]. Electronic timer with multi function features.

## 2.04 FULL VOLTAGE REVERSING

- A. UL Listed / NEMA size 00, 1, 2, 3, 4, 5, 6, 7 consisting of contactor with coil voltage of 24v, 120v, 208v, 240, 480, 575/600v at 50/60 Hz, overload relay, disconnecting means and short circuit protection shall be provided by (thermal magnetic circuit breaker) (magnetic only circuit breaker)( non-fusible disconnect switch)( fusible disconnect switch class J fuse clip) factory assembled in type 1, 3R, 12, 4/4X. Contactors shall be mechanically and electrically interlocked to prevent energizing both contactors simultaneously.
- B. Disconnecting means shall be provided with an external operating

handle mounted in the enclosure door with the means to lock the handle in the off position. Mechanism on the handle shall prevent enclosure door from opening when handle is in the on position.

- C. Short circuit current rating of the combination starter shall be:
  - 1. Fusible type combination, 200 kA @ 600 V max.
  - 2. Breaker type combination rating of 35 kA, 65 kA, or 85 kA @ 480 V max.
- D. Starter shall include the following options:
  - 1. Control power transformer: Transformer shall include primary and secondary fusing.
  - 2. Auxiliary contacts: [1] or [2] normally open and [1] or [2] normally closed.
  - 3. [Phase failure relay [with under-voltage protection] and [elapsed time meter].
  - 4. [Start / Stop Pushbutton] [Hand/off/Auto Selector switch] [Off - On Selector switch] [ Fwd / Rev Pushbutton] [Start Pushbutton] [Fast/Slow/Stop Pushbutton] [Fast/Slow/Off/Auto Selector switch] [Emergency stop Pushbutton]
  - 5. [ Standard LED heavy-duty type pilot light[s]. Color and functionality shall be provided as: [ red wired across coil and through normally open auxiliary contact].
  - 6. [Control relay with 2 normally open and 2 normally closed 10A rated]. Electronic timer with multi function features.

## 2.05 TWO-SPEED, ONE-WINDING

- A. UL Listed / NEMA size 00, 1, 2, 3, 4, 5, 6, 7 [Variable torque] [Constant torque] [Constant horsepower] motor type consisting of two three pole contactors, two overload relays with coil voltage of 24v, 120v, 208v, 240, 480, 575/600v at 50/60 Hz, overload relay, disconnecting means and short circuit protection shall be provided by (thermal magnetic circuit breaker) (magnetic only circuit breaker) (non-fusible disconnect switch) ( fusible disconnect switch class J fuse clip) factory assembled in type 1, 3R, 12, 4/4X. Contactors shall be mechanically and electrically interlocked to prevent energizing both contactors simultaneously.
- B. Disconnecting means shall be provided with an external operating handle mounted in the enclosure door with the means to lock the handle in the off position. Mechanism on the handle shall prevent enclosure door from opening when handle is in the on position.
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- D. Starter shall include the following options:
  - 1. Control power transformer: Transformer shall include primary and secondary fusing.
  - 2. Auxiliary contacts: [1] or [2] normally open and [1] or [2] normally closed.
  - 3. [Phase failure relay [with under-voltage protection] and [elapsed time meter].
  - 4. [Start / Stop Pushbutton] [Hand/off/Auto Selector switch] [Off - On Selector switch] [Fwd / Rev Pushbutton] [Start Pushbutton] [Fast/Slow/Stop Pushbutton] [Fast/Slow/Off/Auto Selector switch] [Emergency Stop Pushbutton]
  - 5. [Standard LED heavy-duty type pilot light[s]. Color and functionality shall be provided as [Red wired across coil and

through normally open auxiliary contact].

6. [Control relay with 2 normally open and 2 normally closed 10A rated]. Electronic timer with multi function features.

## 2.06 TWO-SPEED, TWO-WINDING

- A. UL Listed / NEMA size 00, 1, 2, 3, 4, 5, 6, 7 [Variable torque] [Constant torque] [Constant horsepower] motor type consisting of three, three pole contactors, two overload relays with coil voltage of 24v, 120v, 208v, 240, 480, 575/600v at 50/60 Hz, overload relay, disconnecting means and short circuit protection shall be provided by (thermal magnetic circuit breaker)(magnetic only circuit breaker) (non-fusible disconnect switch)( fusible disconnect switch class J fuse clip) factory assembled in Type 1, 3R, 12, 4/4X. Contactors shall be mechanically and electrically interlocked to prevent energizing both contactors simultaneously.
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  5. [Standard LED heavy-duty type pilot light[s]. Color and

functionality shall be provided as [Red wired across coil and through normally open auxiliary contact].

6. [Control relay with 2 normally open and 2 normally closed 10A rated]. Electronic timer with multi function features.

## Part 3 EXECUTION

### 3.01 INSTALLATION

- A. Inspect for any physical damage
  - B. Install per manufacturer's instructions
  - C. Locate in environment for which the enclosure type is certified.
  - D. Install fuses that are correctly coordinated with characteristics of the installed motor.
  - E. Adjust [circuit breaker], [Solid overload relay], [switches], [doors], [operating handles] for proper [mechanical] and/or electrical operation as described in manufacturers instructions.
  - F. Protect internal components from metal shavings and other debris during installation.
  - G. Clean interior to remove debris as a result of installation.
- Scratched painted surfaces to be repainted to match original color to prevent corrosion.

### 3.02 FIELD QUALITY CONTROL

- A. Inspect installed starters for proper anchoring, alignment, and grounding.
- B. Check tightness of all accessible mechanical and electrical connections [with calibrated torque wrench/screw driver]. Minimum acceptable values are specified in manufacturer's instructions.

## Contact us

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